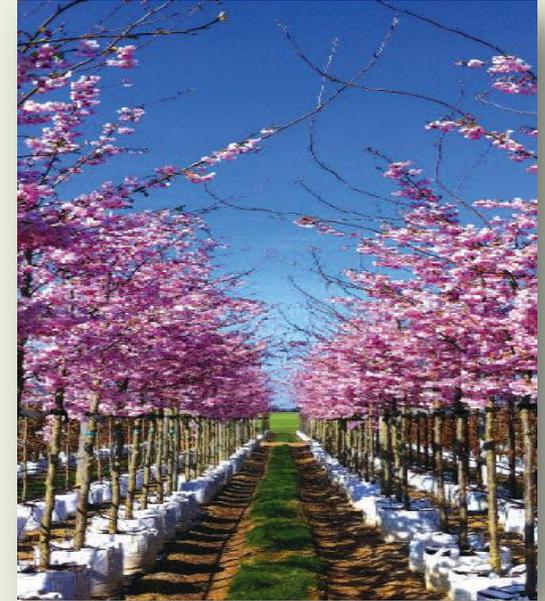
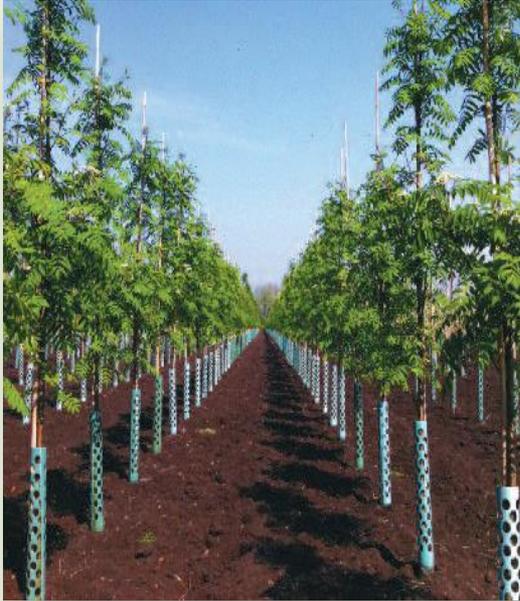


# BIOSECURITY

## A Nursery Grown Response



**Keith Sacre MSc Arb, BSc Arb (Hons) MICFor, Chartered Arboriculturist  
Chair of the Arboricultural Association**

**Arboriculture and Urban Forestry Director at Barcham Trees.**

**Problems with imported pest and disease:  
HERE NOW.....**



**Oak  
Processionay  
Moth**



**Chalara**



**Horse Chestnut  
Leaf Miner**



**Massaria**

# On their way?



Asian long horned beetle

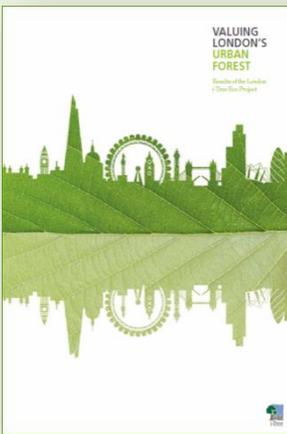


Emerald Ash Borer



*Ceratocystis fimbriata*

And the cost: ..... **TO LONDON**



## Asian Longhorn Beetle



*Acer spp*  
*Aesculus*  
*Albizia*  
*Alnus*  
*Betula*  
*Carpinus spp*  
*Cercidiphyllum*  
*Corylus spp*  
*Fagus spp*  
*Fraxinus spp*  
*Koelreutaria*  
*Platanus*  
*Populus*  
*Prunus*  
*Robinia*  
*Salix spp*  
*Sophora*  
*Sorbus spp*  
*Quercus palustris*  
*Quercus rubra*  
*Ulmus spp*



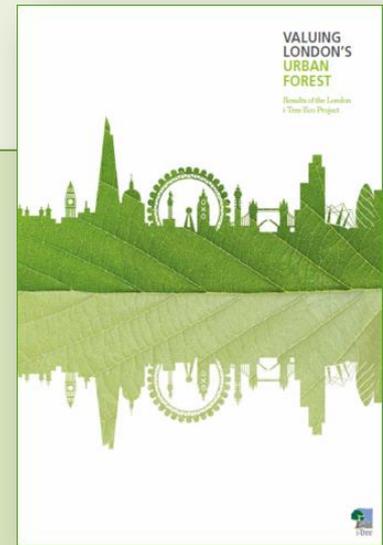
# Asian Longhorn Beetle:

Could impact on some 3.8 million trees

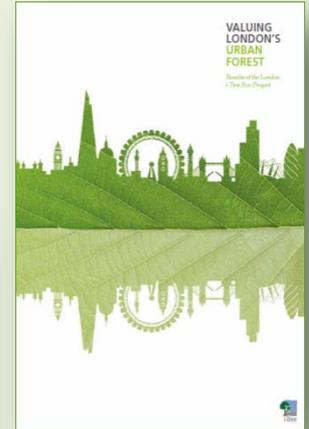
Which represents 31% of the whole population

## Replacing these trees would cost

# £23 billion



# Ash



**Emerald Ash Borer**

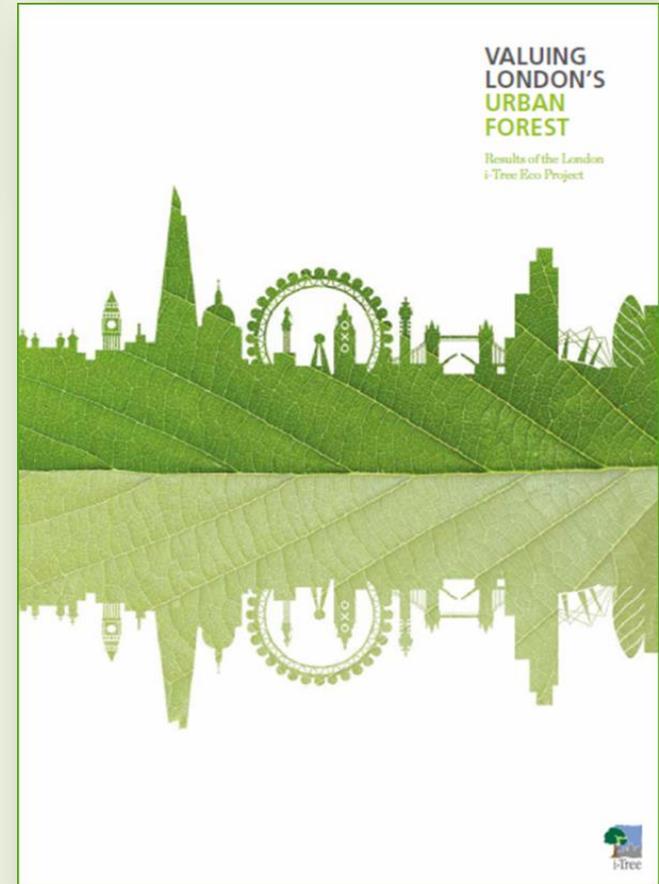


**Ash**

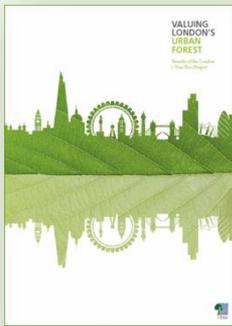
**374,195 trees**

**59763km<sup>2</sup> leaf area**

**6358 mt leaf biomass**



**Replacement cost: £447,345,251.00**

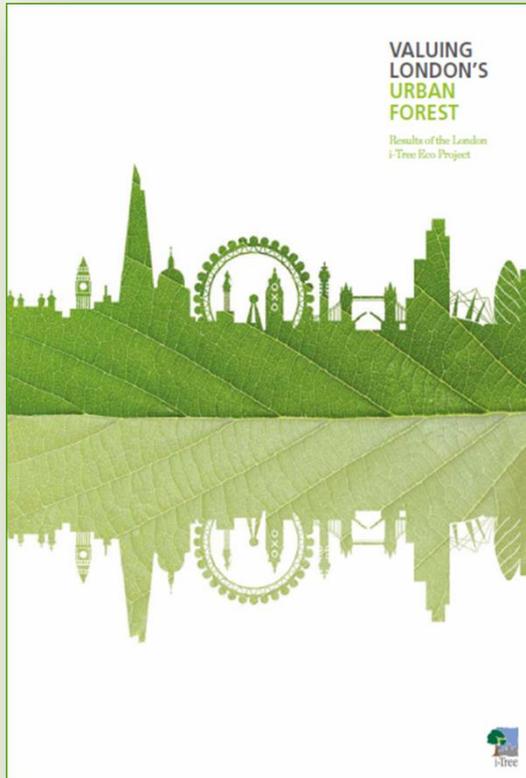


# London Plane:



Plane Wilt  
*Ceratocystis fimbriata f platani*





## London Plane:

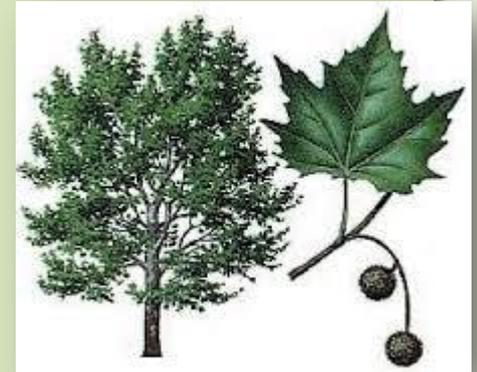
**121,000 trees**

**40,224 km<sup>2</sup> leaf area**

**1756 mt leaf biomass**

**8.9% of the canopy cover in inner London**

**2.5% of the canopy cover in outer London**



**Replacement cost: £351,623,660.00**

## Some of the others on mainland Europe

Pinewood Nematode (*Bursaphelenchus xylophilus*)

Oriental Gall Wasp (*Dryocosmus kuriphilus*)

Red Necked Longhorn (*Aromia bungii*)

Plane Canker (*Ceratocystis fimbriata* f. sp. *platani*)

Sweet Chestnut Canker (*Cryphonectria parasitica*)

Pine Processionary Moth (*Thaumetopoea pityocampa*)

Elm Yellows (Elm Yellows phytoplasma)

Apple Root Knot Nematode (*Meloidogyne mali*)

Ambrosia Beetle (*Megaplatypus mutatus*)

Emerald Ash Borer (*Agrilus planipennis*)

*Xylella fastidiosa*

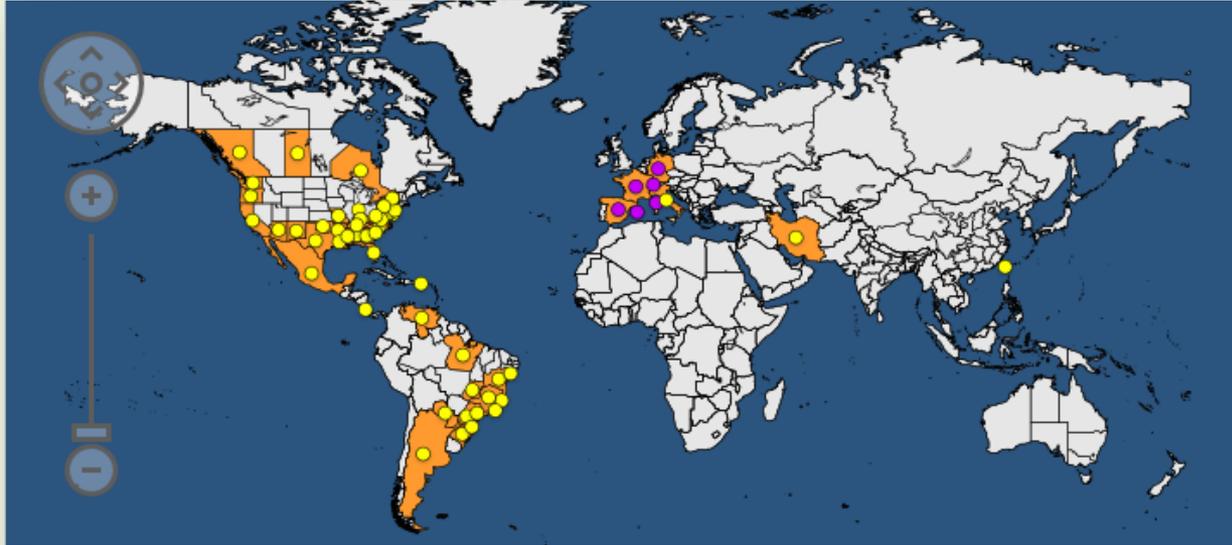
# Xylella, Xylella fastidiosa

Risk spectrum: EPPO A1 quarantine organism, dying tree



Thanks to Henry Kuppen at Terra Nostra for slides on Xylella fastidiosa

# Spread



- Common in coffee plantations in Brazil. Until 2013 in Central- and North America, Iran and Taiwan;
- Since 2013 Italy, 2015 South France, 2016 Spain;
- Intercepted ornamental coffee plants in France, Germany, Italy, Holland and UK.
- October 2017 EU approved increased protection against risk.
- Spread by plants, xylem sucking insects (froghopper, aphid, bug) root grafts.

Source: [www.eppo.int](http://www.eppo.int)

# Symptoms

- **Xylella fastidiosa, 4 subspecies:**
  - X. fastidiosa spp fastidiosa (grape vine, citrus, almond, coffee)
  - X. fastidiosa spp sandyi (coffee citrus, olive)
  - X. fastidiosa spp pauca oleander)
  - X. fastidiosa spp multiplex (highest treat common tree species)
- **Xylella fastidiosa bacterium invades en blockage xylem vessels of woody plants and broadleaved trees.**
- **Bacteria can transport opposite sapflow.**



# Symptoms

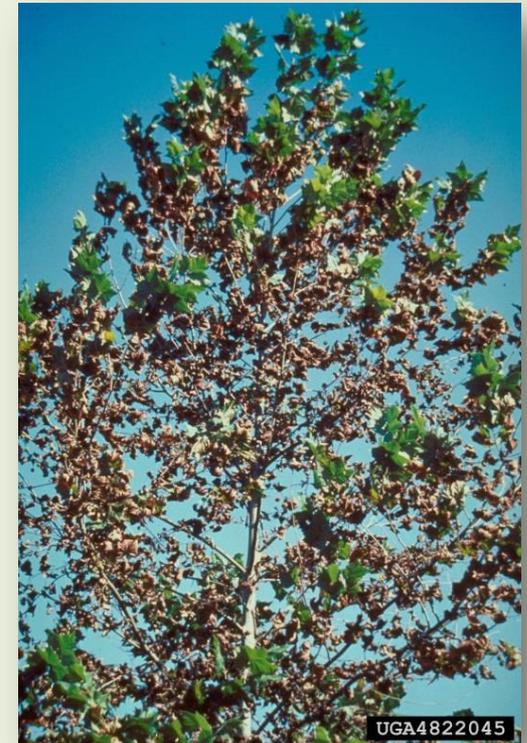
- Symptoms vary, brown ,discolouring leaf often with yellow edge, leaf scorch, wilting.
- With severe infections some of the most host/subspecie combination, dieback or complete dying of tree.
- Bacteria can be in the host without showing damage < 3years.
- Bacteria can die in winter > -18° C.



# Host species

## > 150 host plants:

- ✓ Acer
  - ✓ Aesculus
  - ✓ Fraxinus
  - ✓ Hedera helix
  - ✓ Koelreuteria
  - ✓ Liquidambar
  
  - ✓ Malus
  - ✓ Morus
  - ✓ Olea
- ✓ Platanus
  - ✓ Populus
  - ✓ Prunus
  - ✓ Quercus
  - ✓ Rhamnus
  - ✓ Rhus
  - ✓ Salix
  - ✓ Sambucus
  - ✓ Ulmus
  - ✓ .....



Source: EPPO

Pictures: Defra Plant Pest Factsheet

# At the frontline with Emerald Ash Borer



Picture taken in  
Voronezh, Russia

September 2017.

Approximately four  
hours flying time

A lorry from Preston was  
seen in the city centre

# Problems for the tree nursery:

There is a constant demand for as wider species range as possible.

It is also recognised that resilience is achieved through species diversity



*Celtis australis*



*Lagerstroemia indica*



Brousenettia



Aesculus turbinata



Alnus hirsuta var Siberica





**Chionanthus retusus**

**Carya ovata:**



**Halesia carolina**



**Idesia polycarpa**

# Tree Population Resilience



We need a diversity of trees in our urban forests to guard against disasters like Dutch Elm disease but also to put the right tree in the right place as the evolution of our cities and suburbs creates new settings for tree planting

Frank Santamour 1990



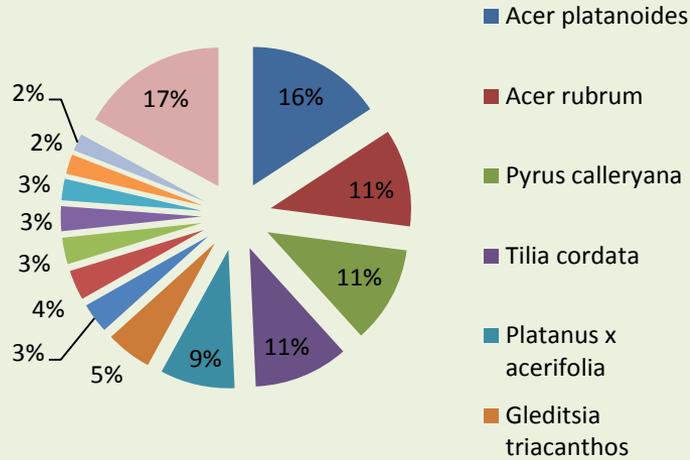
# How is the future of native tree species for urban environments?

- In the UK we have total 41 native tree species
  - Which is (or will get) infested by serious diseases or insect attacks?
  - Which remaining species have the capacity to develop into large healthy trees in inner-city environments?

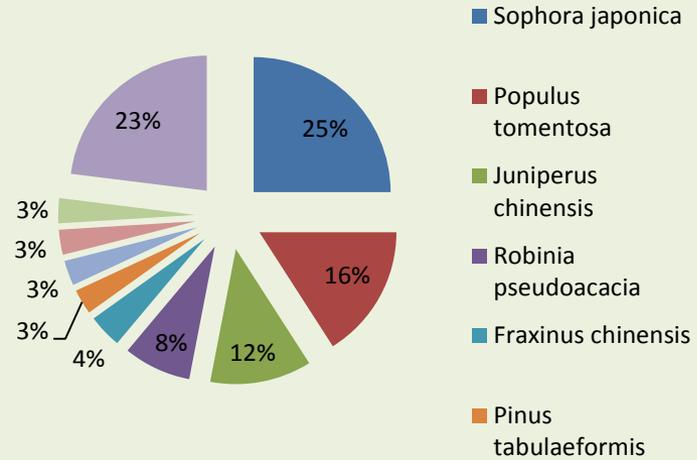
## Native v Exotic

<b>NATIVE SPECIES</b>	<i>From Woodland Trust website</i>		<b>41 in total</b>
Alnus glutinosa	Prunus avium Prunus spinosa	Juniperus communis	Sorbus aucuparia
Frangula alnus	Malus sylvestris	Tilia europea	Sorbus torminalis
Fraxinus excelsior	Cornus sanguinea	Tilia platyphyllos	Euonymus europaea
Populus tremula	Sambucus nigra	Tilia cordata	Salix alba
Rhamnus cathartica	Ulmus glabra	Acer campestre	Salix pentandra
Fagus sylvatica	Viburnum opulus	Quercus robur	Salix fragilis
Betula pubescens	Crateagus monogyna	Quercus petraea	Salix caprea
Betula pendula	Crateagus laevigata	Pyrus cordata	Salix viminalis
Buxus sempervirens	Ilex aquifolium	Pinus sylvestris	Salix alba
Prunus padus	Carpinus betulus	Populus nigra	Taxus baccata

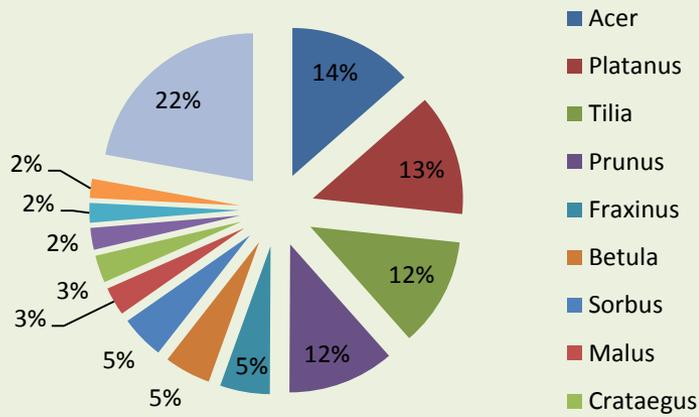
## Pittsburgh, USA



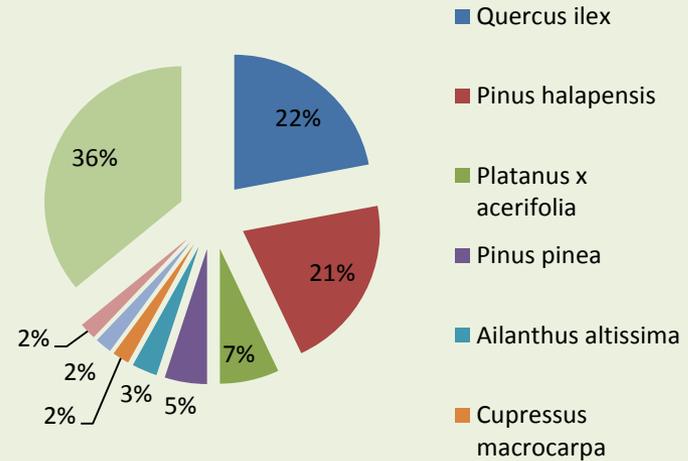
## Beijing, China



## Camden, London, UK



## Barcelona, Spain



(Sjöman et al. – in progress)

**So there is a conflict:**

**The need for bio-security.**

**The need for tree nurseries to supply a wide range**

**of species and cultivars which inevitably involves imports from across the world.**

**The need to use the widest range of species and cultivars in our cities to provide resilience against pest and disease.**

**A total uncertainty as to annual demand for trees.**





Summer



Winter



Is it wise to rely on the authorities and or legislation ?

**Current system not working effectively  
historically slow response to threat  
lots more pests and diseases could arrive**

**Big changes to come both at UK and EC level  
DEFRA committed to implement actions**

**Looking to implement all before 2018**

**Andrew Gaunt PHSI Worthing June 2014**

# **BS 8545 Trees from Nursery to Independence In the Landscape: Published February 2014.**

## **The clause which didn't get in.**

**8.6.1 Bio-security is an important consideration. To minimize the risk of pests and or diseases being imported directly into the UK, all young trees produced abroad but purchased for transplanting should spend at least one full growing season on a UK nursery and be subjected to a full pest and disease control programme.**

**8.6.2 Evidence of this control programme, together with a comprehensive audit trail of when imported trees were received and how long they have been on the nursery, should be obtained from the supplying nursery. The audit trail should extend beyond the nursery after dispatch, allowing for full recall in the event that any pest and/or disease problems manifest themselves in the landscape.**

**Not much help there then.....**

**But each of us either buys or produces trees so  
why look elsewhere for someone else to take  
responsibility ?**



Department  
for Environment  
Food & Rural Affairs

# Protecting Plant Health A Plant Biosecurity Strategy for Great Britain April 2014



# UK Plant Health Information Portal

An online hub for plant health information, data and resources

Enter the name of a pest or plant you are interested in

Alternatively, use [additional searches based on risk register priorities for actions](#) or try an [image based search](#)

There are many pests and diseases that can seriously damage crops and plants in the UK. Assessing and understanding these threats is essential to informing the actions needed to protect plant health set out in [Protecting Plant Health - A Plant Biosecurity Strategy for Great Britain](#).

As the Strategy makes clear, tackling **threats to plant health is not just a matter for government;**

# DEFRA

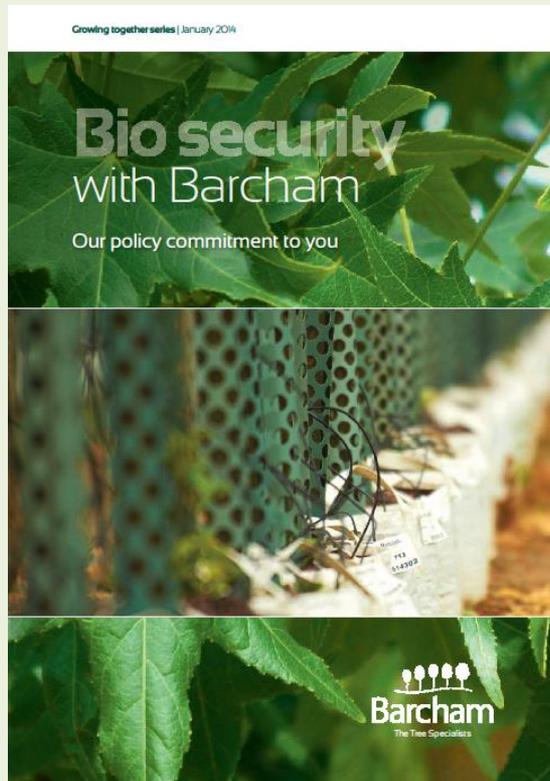
## Plant Health Risk Register

There are now over 900 pests and diseases listed on the register.

These are assessed and graded as to the severity of the threat and the likelihood of occurrence in the UK

threats to plant health is not just a matter for government;

# At Barcham the following policy statement has been published



**Barcham Trees will NOT import trees and sell to customers for immediate planting into the UK landscape. All imported trees will be held on the nursery for one full growing season during which time they will be subjected to rigorous inspection for pest and disease. This includes systematic and regular DEFRA visits to the nursery.**

# Bio security with Barcham

Our policy commitment to you



Every batch of trees imported onto the nursery has its own Batch Number and can be seen on every Barcham Tree. This Batch Number provides a complete audit trail both from supplying nursery and out into the UK landscape once the trees are sold. This precautionary measure enables a complete recall of any batch of trees in the unlikely event of an outbreak of serious pest and disease due to imported tree stock

# Bio security with Barcham

Our policy commitment to you



In addition to the routine pest and disease control programme implemented on the nursery over 15,000 trees across the entire species range are annually, randomly and independently examined for physiological health using leaf fluorescence, chlorophyll content and cell electrolyte leakage. This report is published and available for public inspection.

# ISO 14001: Barcham Trees: BIOSECURITY

## Scope

1. The purpose of this document is to provide a procedure for ensuring that tree stocks are actively checked for diseases and pests that could threaten native UK flora and fauna and what action to take if any are identified. This Procedure also ensures Barcham Trees Plc adheres to its own Bio Security Statement of intent as well the Arboricultural Associations Biosecurity Position Statement.

### 1. Responsibilities

It is the responsibility of the Environmental Management Representative to ensure this procedure is implemented effectively.

It is the responsibility of Management (Operations Director, Production Manager, Nursery Manager & Dispatch Manager) and Staff with key pest and disease control responsibilities (Production Team Leader & QC Team Leader) to ensure that pests and diseases are actively identified, and measures taken to prevent their spread/infestation.

## **1. External Nursery Procedure**

### **1. Supplier Checks**

- 1. Following order and prior to delivery to the nursery, a representative from Barcham will visit the supplier's site during the summer months and conduct a visual inspection of each batch for any Pest & Disease issues.**
- 2. Any issues at this point will be highlighted with the supplier and the supplier batch changed.**
- 3. Stock is physically marked during the supplier visit to indicate it has been inspected and allowing identification at a later stage.**
- 4. Once the stock has been checked and numbers confirmed, the stock is added to the Stock Management System (Access Database) for traceability through to the delivery point at Barcham.**
- 5. A further winter visual inspection is carried out starting in October and a Visit Report Form completed for each supplier (See Records/Supplier Visit Reports).**
- 6. Any issues with a Batch will be marked and rejected where necessary.**
- 7. When all supplier visits have been completed stock can then be scheduled for delivery.**

# **1. Internal Nursery Procedure**

## **4.1 Stock Arriving to The Nursery**

**Stock will be planned to arrive on the Nursery by 31<sup>st</sup> March each year.**

- 1. When stock arrives on the Nursery (Field Stock, Root ball & Container) it is visually inspected during un-loading for any signs of Pest and Disease.**
- 2. Any stock requiring DEFRA notification (See Supporting Documentation\DEFRA Documents) is then to be reported using the EDOMERO system.**
- 3. If any Pest or Disease is found at this point the Nursery Manager will decide what action is required within the next 12hrs i.e. targeted crop spraying, pruning to clean wood or removal of the tree and destruction by burning.**
- 4. Following unloading, stock is taken to either the Bare Root Shed or Root Ball Yard to be potted, depending on its type.**

**Batch numbers are created on Growmaster and identification labels then printed for each batch of trees at the point of potting which include the following information:**

- Six-digit batch number (Unique identification of each tree batch)**
  - Plant Passport Number (If required).**
  - Saleable date (After 1 growing season 5 Months) quarantine period.**
- 1. Stock is then taken to the relevant Nursery Location.**

## **1. Nursery Quarantine Period (5 Months)**

- 1. Managers will conduct weekly Crop Walk Rounds and visually examine the tree crop for signs of plant health and pest and disease.**
- 2. Stock will be monitored during the Quarantine Period using the Pest and Disease Program.**
- 3. If any Pest or Disease is found at this point (Non-notifiable) the Nursery Manager or Production Manager will decide what action is required within the next 12hrs i.e. targeted crop spraying, pruning to clean wood or removal of the tree and destruction by burning.**
- 4. All hand tools used during this period are sprayed with Jet 5 which is kept in a diluted solution in a spray bottle on each platform and within the Potting Shed.**
- 5. Barcham instruct an independent specialist (Dove Associates) to inspect stock which has been identified as a concern for Pest and Disease both on the Nursery and Field.**
- 6. Following the issue of a recommendation report by Dove Associates, appropriate corrective measures are to be applied to the stock.**
- 7. Bartlett Tree Experts are instructed by Barcham to complete vitality testing on stock to ensure it is of optimum health. (J:\ISO 14001 (New Build April 2018)\Supporting Documentation\Bartlett's Vitality Testing).**

## **1. Tree Passports & DEFRA Inspections.**

- 1. Barcham Trees are issued a Plant passport number which is required for certain Tree species to allow all movement. This passport number is issued on all trees leaving the Nursery.**
- 2. ZP codes, as issued by DEFRA, are also issued as required (See SD.001.v01 ZP Codes).**
- 3. The Managing Director is responsible for issuing the Plant Passport information.**
- 4. DEFRA inspect the Nursery twice per year for compliance on pests and diseases.**
- 5. Once DEFRA are satisfied with our stock they will sign a DEFRA Site Visit Record stating the Nursery is compliant.**
- 6. Action must be taken through the corrective and preventative action on any recommendations identified in the reports within agreed timescale set by DEFRA.**
- 7. Batch numbers for trees leaving the site are retained for a period of 1 year to be able to trace back any outbreaks of pests of diseases. (within Growmaster)**



## Biosecurity in Arboriculture and Urban Forestry Position Statement

The Arboricultural Association is committed to promoting the implementation and understanding of good biosecurity practices to assist in safeguarding the future of our trees from the introduction and spread of harmful organisms.

This statement outlines some basic biosecurity principles that should be adopted to reduce the unwanted introduction and spread of tree pests, diseases and invasive tree species:

- Operatives and organisations undertaking work on or around trees should consider the reasonably foreseeable consequences of their activities. Adopting **biosecurity risk assessment** processes and **policy commitments** are prudent first steps.
- Those undertaking work on or around trees have a responsibility to implement routine **biosecurity control measures** for all sites and specific measures for higher risk sites highlighted by the biosecurity risk assessment process. This should include the cleaning and disinfection of clothing, PPE, tools, equipment and vehicles.
- Arboricultural operations such as pruning, felling and planting should be planned, managed and supervised to minimise the movement of arisings and soil. All arisings must be **appropriately disposed of**.
- Organisations working on sites with trees should ensure that their operatives understand biosecurity issues and comply to adopted biosecurity measures. **Training, guidance and supervision** should be provided when necessary.
- Anyone planning, designing, or implementing planting projects should aspire to source **home grown** and nursed specimens avoiding, where possible, directly imported stock to reduce the risk of introduction of pests and diseases.
- Anyone responsible for tree supply should ensure that trees and associated soil are supplied to customers **free of pest and disease** at all points in the supply chain. Consideration must be given to the latency period\* and life cycles of all pests and diseases in order to achieve this. Special attention must be given to imported stock.
- Good urban forestry practice involves managing tree populations to **increase species and genetic diversity** by focusing on the establishment and maintenance of trees with qualities suited to the site and the prevailing climatic conditions. Additionally, good species composition, age structure, stock quality and condition will help reduce the future loss of trees due to the introduction, hybridisation or spread of tree pests and diseases.
- Anyone involved with trees must encourage and promote adherence to these guiding principles and above all **act as role models** in this regard.

\* A period of time where a plant may be infected or infested by a particular pest or disease but where there are no physical symptoms that indicate ill health.

If you are unsure about any of these guiding principles **do not ignore them**. More information and guidance can be found from the following sources:

Arboricultural Association  
[www.trees.org.uk](http://www.trees.org.uk)

Forestry Commission England  
[www.forestry.gov.uk/england-keepitclean](http://www.forestry.gov.uk/england-keepitclean)

These principles are supported by the following organisations



Department  
for Environment  
Food & Rural Affairs



Institute of  
Chartered Foresters



Forestry Commission  
England

These principles are supported by the following organisations



SOCIETY OF  
GARDEN  
DESIGNERS



Royal  
Botanic Garden  
Edinburgh



Landscape  
Institute  
Inspiring great places



A Lead from the  
Arboricultural Association

**Soon to be published as a guidance document**

# **Application of Biosecurity: Arboriculture**

**What is biosecurity and why is it important**

**Managing Tree Populations with biosecurity in mind**

**Building resilience into tree populations**

**The trade in plants and trees**

**Appendices and case studies**

# **All Arboricultural Association Approved Contractors: will have to.....**

- **Have a company level biosecurity policy in place**
- **Include biosecurity in their risk assessment processes**
- **Provide equipment and appropriate training to understand and undertake biosecurity control measures.**



**And so what can you  
contribute towards  
increased biosecurity ?**

**Thanks for listening**